

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
7 April 2005 (07.04.2005)

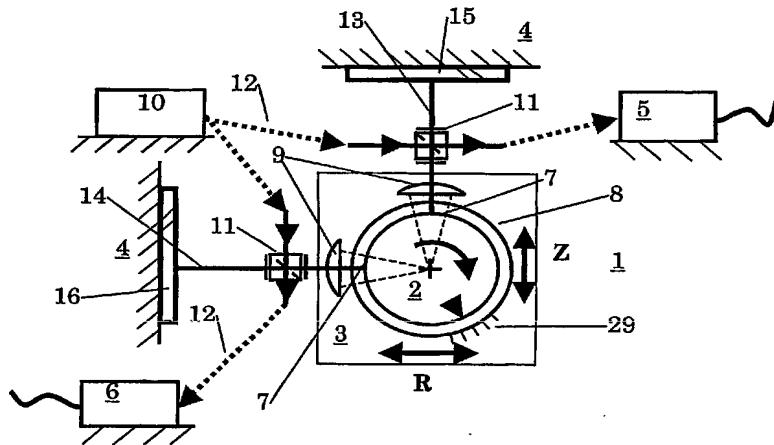
PCT

(10) International Publication Number
WO 2005/031255 A1

- (51) International Patent Classification⁷: **G01B 21/04, 21/20, 9/02, G01M 11/02**
- (21) International Application Number: **PCT/NL2004/000672**
- (22) International Filing Date: **29 September 2004 (29.09.2004)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data: **03078094.4 29 September 2003 (29.09.2003) EP**
- (71) Applicant (*for all designated States except US*): **NEDERLANDSE ORGANISATIE VOOR TOEGEPAST-NATUURWE- TENSCHAPPELIJK ONDERZOEK TNO [NL/NL]; Schoemakerstraat 97, NL-2628 VK Delft (NL).**
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): **HENSELMANS, Rens [NL/NL]; Edenstraat 10 C, NL-5615 GA Eindhoven**
- (NL). **ROSIELLE, Petrus, Carolus, Johannes, Nicolaas [NL/NL]; Kapteynlaan 25, NL-5505 AV Veldhoven (NL).**
- (74) Agent: **WINCKELS, J., H., F.; Vereenigde, Johan de Witlaan 7, NL-2517 JR Den Haag (NL).**
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.**
- (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): **ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).**

[Continued on next page]

(54) Title: FREE-FORM OPTICAL SURFACE MEASURING APPARATUS AND METHOD



(57) Abstract: A surface measuring apparatus for measuring a surface shape of an element comprises a measurement frame (4) comprising a mount for mounting the element to be measured, a stage (3) comprising a rotatable device (2), the stage being movable in at least a first direction relative to said measurement frame, and a contactless distance measurement device (5,6) for measuring in said first direction a distance between said measurement frame and a predetermined measurement surface (7) provided on said rotatable device. The apparatus further comprises a second distance measurement device (2) for measuring in a second direction a second distance between said device and a selected position on a surface of an element mounted relative to said measurement frame and a rotation measurement device (29) for measuring an angle of rotation between said first and second direction. In this way, aspheric or free-form surfaces of optical elements can be measured easily in closed loop without introducing abbe-errors.

WO 2005/031255 A1



Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.